APPENDIX

# Major Contributors Recommended Resources

## Major Contributors

***Doris Ash*** is a science educator at the Exploratorium, a museum of science, art, and perception in San Francisco, California. Dr. Ash has a background in biology, teaching, and research in learning and learning environments. She has done research with the Fostering a Community of Learners (FCL) project at the University of California, Berkeley, gender research in Oakland, California, and worked on teacher professional development at the Institute for Inquiry. She has an M.S. and B.S. in Biology from Cornell University and a Ph.D. in Science Education from U.C. Berkeley.

***Dennis Bartels*** is director of the Center for Teaching and Learning at the Exploratorium in San Francisco, California. Before joining the Exploratorium, Dr. Bartels was principal investigator and project director of the NSF South Carolina Statewide Systemic Initiative and directed the development of the State Curriculum Frameworks there. He is a graduate of the University of North Carolina and received his Ph.D. in Education Administration and Policy Analysis from Stanford University. He was recently appointed chair to the State Advisory Committee of the California Science Project and serves on several committees, advisory boards, and review panels for the National Science Foundation.

***Peter Dow*** has a background in teaching, business, curriculum design, and teacher professional development. He currently serves as principal investigator of TEAM 2000, an NSF Local Systemic Change (LSC) project that is a collaboration between the Buffalo Public Schools and Buffalo State College. He is employed by the Research Foundation of the College

and is President of First Hand Learning, Inc., a nonprofit corporation he co-founded in 1998 to develop materials and programs that support inquiry-based learning and to foster partnerships between cultural institutions and schools. Dr. Dow recently served on the Committee on Science Education K–12 of the National Research Council, where he chaired the subcommittee that developed the Inquiry Addendum to the National Science Education Standards. He is the author of *Schoolhouse Politics: Lessons from the Sputnik Era* and holds A.B., A.M.T., and Ed.D. degrees from Harvard University.

***Hubert M. Dyasi*** is professor of Science Education and director of New York's City College Workshop Center, a science teacher development institution. Dr. Dyasi has been a co-principal investigator in the New York State Systemic Initiative on K–8th grade mathematics, science, and technology education. He served as a member of the working group on teaching standards for the *National Science Education Standards*, and is now helping to develop an addendum to the Science as Inquiry Standard. In 1995, the NSF National Institute for Science Education at the University of Wisconsin-Madison selected Professor Dyasi as one of its first fellows.

***Wynne Harlen*** has been director of the Scottish Council for Research in Education since 1990 and was previously professor of Science Education at the University of Liverpool. She began her professional life as a teacher and college lecturer in science and has been engaged in curriculum development, research, and assessment in science for over 30 years. She worked on the Assessment of Performance Unit's monitoring of science for 7 years. Her research into students' learning has given her particular interest in using assessment to improve teaching and learning. She has published 19 books and contributed to 30 others.

***George E. Hein,*** professor emeritus, taught and worked at Lesley College in Cambridge, Massachusetts, for over 20 years, where he was founding director of the college's Ph.D. program. He has developed comprehensive, qualitative evaluation systems for mathematics and science education programs. He founded the Program Evaluation Research Group (PERG) at Lesley College in 1976 to evaluate the educational work of Boston-area museums and arts organizations. He served as both

secretary and chair of ICOM/CECA, the international association for museum educators. In 1999, he was an Osher Fellow at the Exploratorium.

***Barry Kluger-Bell*** has worked as a physicist, college-level physics teacher, science teacher educator, and program director. He earned a Ph.D. in physics from the University of Colorado, Boulder. He has worked as teacher/physicist at the Exploratorium since 1988. In this position, Dr. Kluger-Bell has served as science resource teacher, planned and led workshops, and developed curriculum and professional development materials. He has also worked in classrooms with elementary teachers and children. Dr. Kluger-Bell currently serves as assistant director for science at the Exploratorium Institute for Inquiry.

***Sabra Lee*** has an undergraduate degree in biology and a master's degree from Tufts University in education with a strong background in mathematics and the arts. She has worked in mathematics and science education at TERC and Lesley College for more than 20 years. Her experience includes educational program evaluation, curriculum and resource development, documentation, and workshops for educators, teachers, and parents. She currently works primarily in elementary school mathematics and science education, designing and carrying out program evaluations and creating professional development and curriculum materials. She is lead evaluator for two NSF Local Systemic Change (LSC) projects, as well as for other mathematics and science projects. She has written about active science assessment as well as mathematics professional development.

***Lynn Rankin*** is director of the NSF Exploratorium Institute for Inquiry, a professional development program for elementary educators that develops partnerships with school districts and serves as advisors to local and national science education reform efforts. With a degree in education from the University of Arizona and a background as a classroom teacher and curriculum developer, she is currently serving on a committee of specialists developing the addendum to the *National Science Education Standards* on scientific inquiry, and a committee sponsored by the NSF National Institute for Science Education at the University of Wisconsin-Madison to examine effective professional development strategies for science education.

***Mark St. John*** is the founder and president of Inverness Research Associates, a small firm specializing in evaluation, policy analysis, and technical assistance. For the past decade, Dr. St. John and his associates have studied a wide variety of investments in educational reform, including major professional development efforts, curriculum development projects, assessment reforms, and larger systemic change initiatives. Over the past 5 years, he has been involved in national studies of NSF's science education projects and the national Eisenhower program. He is currently involved as an evaluator and provider of technical assistance to the NSF's Statewide Systemic Initiatives.

***Karen Worth*** has been a member of the Wheelock College faculty for over 25 years, where she teaches early childhood and elementary education at the graduate level, directs grant programs in science education, and works as advisor and technical assistant with the Boston Public Schools. She served as chair of the working group on teaching standards for the *National Science Education Standards.* She also is a senior scientist at Education Development Center, Inc., in Newton, Massachusetts, where she was principal investigator for the development of the NSF-supported Insights Elementary Science Curriculum and currently serves as co-director of the NSF Center for Urban Science Education Reform, which provides technical assistance and resources to 22 urban school districts. She works as a consultant and advisor to many urban systemic reform efforts and science education programs nationwide.

# RECOMMENDED RESOURCES

## Books

Doris, E. (1991). *Doing what scientists do: Children learn to investigate their world.* Portsmouth, NH: Heinemann.

Driver, R. (1983). *The pupil as scientist?* Buckingham, England: Open University Press.

Driver, R., Guesne, E., and Tiberghien, A. (eds.) (1985). *Children's ideas in science.* Buckingham, England: Open University Press.

Drummond, M.J. (1994). *Learning to see: Assessment through observation*. Ontario: Pembroke Publishers.

Duckworth, E. (1987). *"The having of wonderful ideas" and other essays on teaching and learning.* New York: Teachers College Press.

Gallas, K. (1995). *Talking their way into science: Hearing children's questions and theories, responding with curricula.* New York: Teachers College Press.

Harlen, W. (1996). *The teaching of science in primary schools*, 2d ed. London: David Fulton Publishers Ltd.

Harlen, W., and Jelly, S. (1989). *Developing science in the primary classroom*. Essex, England: Addison Wesley Longman Ltd.

Hein, G.E., and Price, S. (1994). *Active assessment for active science: A guide for elementary school teachers.* Portsmouth, NH: Heinemann.

James, M. (1998). *Using assessment for school improvement.* Oxford: Heinemann.

Layman, J.W., Ochoa, G., and Heikkinen, H. (1996). *Inquiry and learning: Realizing science standards in the classroom*. New York: College Entrance Examination Board.

National Research Council. (1999). *Inquiry and the national science education standards: A guide for teaching and learning.* Washington, DC: National Academy Press.

National Research Council. (1996). *National science education standards.* Washington, DC: National Academy Press.

Osborne, R., and Freyberg, P. (1985). *Learning in science: The implications of children's science.* Auckland, NZ: Heinemann.

Saul, W., and Reardon, J. (eds.) (1996). *Beyond the science kit: Inquiry in action.* Portsmouth, NH: Heinemann.

Shapiro, B.L. (1994). *What children bring to light: A constructivist perspective on children's learning in science.* New York: Teachers College Press.

Short, K.G., et al. (1996). *Learning together through inquiry: From Columbus to integrated curriculum.* York, ME: Stenhouse Publishers.

Whitin, P., and Whitin, D.J. (1997). *Inquiry at the window.* Portsmouth, NH: Heinemann.

## Videos

National Gardening Association. *Windows on the classroom.* Four-part series. Burlington, VT.

Rosebery, A., and Warren, B. (1996). *Sense making in science.* Three-part series. Westport, CT: Heinemann.

WGBH Educational Programming. (1999). *Science K–6: Investigating classrooms.* Twelve-part video with supporting print publications. Boston, MA.

WNET. (1997). *Just think: Problem solving through inquiry.* Six-part series. Albany, NY: Office of Educational Television and Public Broadcasting.

Zubrowski, B., and Education Development Center, Inc. *Learning to see: Observing children's inquiry in science.* Westport, CT: Heinemann.

## Web Sites

American Association for the Advancement of Science/Benchmarks for Science Literacy:
http://project2061.aaas.org/tools/benchol/bolframe.html

Exploratorium Institute for Inquiry:
http://www.exploratorium.edu/IFI/index.html

National Science Education Standards:
http://www.nap.edu/readingroom/books/nses

National Science Foundation:
http://www.nsf.gov